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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,842	11/14/2003	Michael Goldstein	10559-783002	9207
20985	7590	09/06/2006	EXAMINER	
FISH & RICHARDSON, PC P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			AMARI, ALESSANDRO V	
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Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/713,842	<b>Applicant(s)</b> GOLDSTEIN, MICHAEL	
	<b>Examiner</b> Alessandro Amari	<b>Art Unit</b> 2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 27 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 8-17 and 21-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8-15 and 21-27 is/are rejected.
- 7) ☒ Claim(s) 16 and 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 8-12 and 21-23 are objected to because of the following informalities:

Regarding claims 8 and 21, the recitation that the first reflective surface has a curvature such that substantially all of the reflected light rays propagate at a first angle relative to the axis that passes through the point and converge towards a region to produce uniform illumination seems to be misdescriptive of the invention. Given that substantially of the rays are propagating at the same angle from the first reflective surface, there is something missing from the claim in order for the light rays to converge. The light rays from the first reflective surface converge towards a region with other light rays from other reflective surfaces that is, they are converging with each other but by themselves the light rays from the first reflective surface do not converge towards a region to form uniform illumination. Claims 9-12 and 22-23 inherit the same issue.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 8, 11-15 and 21-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Foo US 6,231,198.

In regard to claims 8 and 21, Foo discloses (see Figure 5) an apparatus or method comprising a first reflective surface (514) to reflect light rays emanating from a point (506), the first reflective surface having a curvature such that substantially all of the reflected light rays propagate at a first angle relative to an axis that passes through the point and converge towards a region to produce uniform illumination at the region as described in column 5, lines 1-67, column 6, lines 1-67 and column 8, lines 26-30.

Regarding claims 11 and 22, Foo discloses (see Figure 5) a second reflective surface to reflect light rays emanating from the point, the second reflective surface having a curvature such that the reflected light rays propagate at a second angle with the optical axis, the reflected light rays forming an annular wave front that converges towards the region as shown in Figures 5B-5D and as described in column 5, lines 1-67 and column 6, lines 1-67.

Regarding claims 12 and 23, Foo discloses that the second angle is different from the first angle as described in column 5, lines 1-67 and column 6, lines 1-67.

In regard to claim 13, Foo discloses (see Figure 5) an apparatus comprising a reflective surface (514) positioned relative to an optical axis to reflect light rays emanating from a location (506) on the optical axis so that the light rays converge towards a region on a plane (520, 542) perpendicular to the optical axis, the reflective

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surface having a curve segment that comprises a section of a parabolic curve (512) that has a focal point at the location and has been rotated through an angle relative to the optical axis about an axis of rotation that is non-parallel to the optical axis as shown in Figures 5A-5D and as described in column 5, lines 1-67 and column 6, lines 1-67.

Regarding claim 14, Foo discloses that the reflective surface comprises the surface swept by sweeping the curve segment about the optical axis as shown in Figures 5B-5D and as described in column 5, lines 1-67 and column 6, lines 1-67.

Regarding claim 15, Foo discloses that the rotation angle of the parabolic curve (512) equals the angle between the optical axis and a propagation direction of light rays reflected by the reflective surface as shown in Figures 5B-5D and as described in column 5, lines 1-67 and column 6, lines 1-67.

In regard to claim 24, Foo discloses (see Figure 5) a method comprising providing a first reflective surface (514) to reflect light rays emanating from a location, the first reflective surface having a curvature such that reflected light rays propagate in a direction at a first angle with an axis and converge toward a region to produce uniform illumination at the region; and providing a second reflective surface (any of the other reflective surfaces 514 following the parent parabolic surface 512) to reflect light rays emanating from the location, the second reflective surface having a curvature such that reflected light rays propagate in a direction at a second angle with the axis and converge toward the region, the second angle different from the first angle as described in column 5, lines 1-67, column 6, lines 1-67 and column 8, lines 26-30.

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4. Claims 24-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Vasylyev et al US 6,620,995.

In regard to claim 24, Vasylyev et al teaches (see Figures 1, 2, 5, 6) a method comprising providing a first reflective surface (18) to reflect light rays emanating from a location, the first reflective surface having a curvature such that reflected light rays propagate in a direction at a first angle with an axis and converge toward a region to produce uniform illumination at the region as shown in Figures 1, 5 and 6, and providing a second reflective surface (18) to reflect light rays emanating from the location, the second reflective surface having a curvature such that reflected light rays propagate in a direction at a second angle with the axis and converge toward the region, the second angle different from the first angle as can be seen in Figures 1, 5 and 6 and as described in column 3, lines 51-67 and column 4, lines 1-24.

Regarding claim 25, Vasylyev et al teaches (see Figure 1) that the first reflective surface (one of the reflective surfaces 18 closest to the spot 20) and the second reflective surface (one of the reflective surfaces closer to the source) are concentric to the axis and the first reflective surface is closer to the location than the second reflective surface as shown in Figure 1.

Regarding claim 26, Vasylyev et al teaches further comprising adjusting the relative positions of the first and second reflective surfaces so that when light rays are reflected by the first reflective surface, the reflected light rays are not blocked by the second reflective surface as described in column 7, lines 57-65.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foo US 6,231,198 in view of Takahashi US 6,172,825.

Regarding claims 9 and 10, Foo teaches the invention as set forth above but does not teach in regard to claim 9, that the reflective surface comprises a ruthenium layer or in regard to claim 10, that the reflective surface comprises multilayer coatings.

Regarding claims 9 and 10, Takahashi teaches that the reflective surface comprises a ruthenium layer or comprises multilayer coatings as described in column 8, lines 21-25.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a ruthenium layer or multilayer coatings of Takahashi in the apparatus of Foo in order to properly reflect light in the ultraviolet spectrum for applications of interest (i.e., projection lithography) in that frequency range.

7. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vasylyev et al US 6,620,995.

Regarding claim 27, Vasylyev et al teaches the invention as set forth above but does not teach further comprising treating the surface of the first and second reflective surfaces to enhance reflectivity of light having a wavelength less than 300nm. It is well

known in the radiant energy art to have reflective surfaces keyed to reflect certain wavelengths. It would have been obvious to one having ordinary skill in the art at the time the invention was made to treat the surface of the first and second reflective surfaces to enhance reflectivity of light having a wavelength less than 300nm in order to properly reflect and focus light in the ultraviolet spectrum for application of interest in that frequency range.

***Allowable Subject Matter***

8. Claims 16 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claim 16 is allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, the rotated parabolic curve represented by the claimed equation as set forth in the claimed combination.

Claim 17 is allowable over the prior art for at least the reason that the prior art fails to teach or reasonably suggest, the rotated parabolic curve represented by a truncated expansion of the claimed equation as set forth in the claimed combination.

The prior art of record teaches an apparatus comprising a reflective surface positioned relative to an optical axis to reflect light rays emanating from a location on the optical axis so that the light rays converge towards a region on a plane perpendicular to the optical axis, the reflective surface having a curve segment that comprises a section of a parabolic curve having a focal point at the location and rotated an angle relative to the optical axis. However, the prior art does not teach that the



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rotated parabolic curve is represented by the recited equations and there is no motivation or teaching to modify this difference as derived.

### ***Response to Arguments***

10. Applicant's arguments with respect to claims 8-23 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments filed on 27 June 2006 in regard to claims 24-26 (Vasylyev) have been fully considered but they are not persuasive. Applicant argues that each concave reflective element of Vasylyev does not have a curvature such that "substantially all of the reflected light rays propagate at a first angle relative to an axis".

In response to this argument, the Examiner would like to point out that the current recitation of claim 24 does not recite that "substantially all of the reflected light rays propagate at a first angle relative to an axis". Rather, it only recites that the first reflective surface and the second reflective surface "reflect light rays". Therefore, Examiner believes that Vasylyev (as shown in Figure 5) meets the current limitation and the rejection for claims 24-26 is maintained.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Pressley US 4,475,027 and Hohberg US 5,285,320 teach apparatus comprising reflective surfaces having curvatures which produce uniform illumination at a region.

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12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro Amari whose telephone number is (571)272-2306. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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01 September 2006

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